ZTEWelink Wireless Module User Guide for EmbeddedLinux

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Revision History

Version	Date	Author	Description
V1.0	2012-07-18	0193000039	Initial version of document.
V1.1	2013-03-11	0193000037	Increase reversion, Legal Information. Update version, modify some mistake
V1.2	2013-04-02	0193000037	Modify the logo of cover and page footer Modify Legal Information Increase the revision history
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Note: Consult our website for up-to-date product descriptions, documentation, application notes, firmware upgrades, troubleshooting tips, and press releases

Besides, ZTEWelink provides various technical support ways to the customers, such as support by phone, website, instant messaging, E-mail and on-site.

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1 Introduction

1.1 Purpose

This document is intended as a guide to describe how to set up and connect to the Internet using ZTEWelink Wireless Modem on the EmbeddedLinux platform using open source software packages. Although this document is provided to guide current Linux users to use ZTEWelink Wireless Modems on any EmbeddedLinux distribution, however, the setup instructions in this document has been tested with uCLinux. For setup on other Linux distributions, you should still be able to follow the instructions after you download and install the necessary software packages outlined below.

1.2 Scope

The readers of this document are assumed to software developers generally familiar with EmbeddedLinux development.

1.3 Conventions

Function declarations, function names, type declarations, and code samples appear in a different font. For example: *#include*

Red font means the information should be notes, if ignore this may cause some failures. For example: /dev/ttyUSB

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2 Driver Integration

2.1 Enable USB-modem driver from kernel

USB-modem driver may be not enabled in the kernel, so please go to kernel, do make menuconfig and select Device Drivers -> USB -> USB serial -> GSM modem, then enable it to be built-in：

-CONFIG_USB_SERIAL=y

-CONFIG_USB_SERIAL_GENERIC=y

-CONFIG_USB_SERIAL_OPTION=y

For modem with ECM/NDIS interface, enable following module additionally:

-CONFIG_USB_NET_CDCETHER=y

2.2 Add VID/PID to USB-modem driver

Modify driver file option.c which locates in \linux-source-2.6.XX\drivers\usb\serial. Add modem PID and VID in driver id_table:

```
static struct usb_device_id option_ids[] = {
{ USB_DEVICE(0x19d2, 0x0117 },
```

0x19d2 is ZTE VID, it is appropriate for all ZTEWelink wireless modems. 0x0117 modem PID which may vary with the modem you use, you can use `lsusb` to get it.

ECM interface can be used to setup data call on ZM8510/ZM8620/ME3960 modem. Switch modem to ECM mode using AT command, then reboot the modem:

```
AT+ZSWITCH=L
AT+ZRST
```

For ZM8510/ZM8620/ME3960 modem the modification is different, you should add the modem PID, VID, bInterfaceClass, bInterfaceSubClass in driver file option.c which locates in same path as above:

```
static struct usb_device_id option_ids[] = {
{ USB_DEVICE_AND_INTERFACE_INFO(0x19d2, 0x0396, 0xff, 0xff, 0xff) },
{ USB_DEVICE_AND_INTERFACE_INFO(0x19d2, 0x0396, 0xff, 0x00, 0x00) },}
```

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2.3 Enable PPP feature from kernel

PPP may not enable in the kernel. Managed to fix the issue by go to kernel, do make menuconfig and select Device Drivers -> Network Device Support -> and then enable following to be built-in:

- CONFIG_PPP=y

-CONFIG_PPP_ MULTILINK=y

-CONFIG_PPP_FILTER=y

-CONFIG_PPP_ASYNC=y

-CONFIG_PPP_SYNC_TTY=y

2.4 Build the kernel

Build kernel, and flash this kernel file to target board, reboot target board.

2.5 Verify whether modem driver is loaded

After reboot target system, Plug in the modem, then driver can be loaded successfully now. Although it is not necessary to verify the result of the driver integration step above, if you want to be sure that the driver is now associated with your modem. Attach the modem to the target board and run the following on the command-line:

"dmesg|grep -i ttyUSB"

You should see something like:

usb 5-1: generic converter now attached to ttyUSB0

usb 5-1: generic converter now attached to ttyUSB1

usb 5-1: generic converter now attached to ttyUSB2

This LOG indicates the usb serial driver has been loaded. In general, each ZTE modem has multi interface. For different ZTE modem, the device node of modem port and AT port may different. Please contact customer manager of ZTE to get Modem interface information.

If ZM8510/ZM8620/ME3960 modem is used, run "ifconfig" command in command line, you should see a new network card appeared which named "usbx/ecmx/ethx", "x" can be any number. This indicates ZM8510/ZM8620/ME3960 ECM interface driver is loaded sucessfully.

For example, MF206, AC100 and ZM8510/ZM8620 may have the port information as Table 2-1.

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Table 2-1

PID:0x0117 (MF206)	0	Diag interface	/dev/ttyUSB0
	1	AT interface	/dev/ttyUSB1
	2	Modem interface	/dev/ttyUSB2
PID:0x152 (AC100)	0	Modem interface	/dev/ttyUSB0
	1	Diag interface	/dev/ttyUSB1
	2	AT interface	/dev/ttyUSB2
PID:0x0396 (ZM8510/ ZM8620/ ME3960)	0	Ding interface	/dev/ttyUSB0
	1	AT interface	/dev/ttyUSB1
	2	Modem interface	/dev/ttyUSB2
	3	ECM Control interface	New network card named usbx/ecmx/ethx, “x” can be any number.
	4	ECM Data interface	
	5	Adb interface	Used to debug

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3 Make Data Connection Using PPPD and CHAT

This section gives an example for how to setup a data connection using pppd and chat program. You should have done Section 2, so that your device can be recognized by the system. This also assumes you have already downloaded pppd and install on your current Linux distribution. For ZM8510/ZM8620/ME3960 LTE modem, although it can use pppd to setup a data connection, but the speed may be limited, we recommend to uses ECM to setup data connection on ZM8510/ZM8620/ME3960 modem, reference to chapter 3.5.

3.1 Sample script for data connect using WCDMA modem

File 1: ppp-on

#!/bin/sh
clear
OPTION_FILE="zte_options"
DIALER_SCRIPT=$(pwd)/zte_ppp_dialer
exec /usr/sbin/pppd file $OPTION_FILE connect "/usr/sbin/chat -v -f ${DIALER_SCRIPT}"

This file is the main script using option file “zte_options” and “zte_ppp_dialer”

File 2: zte_options

/dev/ttyUSB2
115200
crtscts
modem
persist
lock
noauth
noipdefault
debug
nodetach
user Anyname
password Anypassword
ipcp-accept-local
ipcp-accept-remote
replacedefaultroute
defaultroute

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usepeerdns
noccp
nobsdcomp
novj
dump

Note: /dev/ttyUSB2 is the modem interface of your device, please ref table 2-1 to use proper modem interface**.**

User and password may be different due to mobile operator. If operator do not provide username and password, please use Anyname and Anypassword.

File 3: zte_ppp_dialer

ABORT "NO CARRIER"
ABORT "ERROR"
TIMEOUT 120
"" ATE
SAY "ATE"
ECHO ON
OK ATH
OK ATP
OK AT+CGDCONT=1, \"IP\",\"3GNET\"
*OK ATD*99#*
CONNECT

Note: the number *99# may vary with your mobile operator; *99# is valid in CHINA UNICOM. CMNET is the APN may vary with your mobile operator; 3GNET is valid in CHINA UNICOM.

File4: disconnect

#!/bin/sh
killall pppd

3.2 Sample script for data connect using CDMA modem

File 1: ppp-on

#!/bin/sh
clear
OPTION_FILE="zte_options"
DIALER_SCRIPT=$(pwd)/zte_ppp_dialer
exec /usr/sbin/pppd file $OPTION_FILE connect "/usr/sbin/chat -v -f ${DIALER_SCRIPT}"

This file is the main script using option file “zte_options” and “zte_ppp_dialer”

File 2: zte_options

/dev/ttyUSB0

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115200
crtscts
modem
persist
lock
noauth
noipdefault
debug
nodetach
user card
password card
ipcp-accept-local
ipcp-accept-remote
replacedefaultroute
defaultroute
usepeerdns
noccp
nobsdcomp
novj
dump

Note: /dev/ttyUSB0 is the modem interface of your device, please ref table 2-1 to use proper modem interface**.**

User and password may be different due to mobile operator. If operator does not provide username and password, please use Anyname and Anypassword. The username and password "card" is valid in CHINA TELECOM.

File 3: zte_ppp_dialer

```
ABORT           "NO CARRIER"
ABORT           "ERROR"
TIMEOUT         120
""              ATE
SAY             "ATE"
ECHO            ON
OK              ATH
OK              ATP
OK              "AT+ZCAPN=card,card"
OK              ATD#777
CONNECT
```

Note: the number #777may vary with your mobile operator, #777 is valid in CHINA TELECOM. *"AT+ZCAPN=card(usrname), card(password)"* sets the username and password may be different due to mobile operator. If operator do not provide username and password, please do not add this command.

File4: disconnect

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#!/bin/sh

killall pppd

3.3 Start to dial and connect

Open a terminal window and run the Main script “ppp-on” start to dial and connect

3.4 Disconnect

The way 1: entry “ctrl+c” at a terminal window;

The way 2: run the disconnect script.

3.5 Setup data call via ECM

ECM interface can be used to setup data call on ZM8510/ZM8620/ME3960 modem. The data connection can be setup by following steps:

Step0: switch modem to ECM mode using AT command, then reboot the modem:

AT+ZSWITCH=L

AT+ZRST

Step1: setup data call parameter using AT command +CGDCONT. For example, can configure APN “zte.com” using command as below:

AT+CGDCONT=1,”ip”,”zte.com”

Step2: setup ECM data call using AT command +ZECMCALL. For example:

AT+ZECMCALL=1

Step3: start DHCP to get IP and DNS. For example, use command as below:

dhcpcd usb0

Step4:check whether network card get IP/DNS address. For example:

ifconfig

Step5:disconnect ECM data call using blew command:

AT+ZECMCALL=0

Please refer to AT command document for further more information.

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4 TROUBLESHOOTING

4.1 Dropped connection

In the event that the connection is lost due to any reason, a manual reconnect is required. You can configure your connection to automatically redial on disconnect.

4.2 DNS issues

For DNS-related issues, please verify entries in /etc/resolv.conf file. Please refer to your Linux distribution‘s user manual for more information about fixing this problem.

4.3 How to get log

If some error occurred, please provide us the QXDM LOG. The LOG can be captured on Linux by the tools provided by ZTE named DiagLog which can be found in directory dir/tools/DiagLog.

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